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IS 484 (1980): Silica Refractories for General Purposes  
[MTD 15: Refractories]



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*Indian Standard*  
SPECIFICATION FOR  
SILICA REFRACTORIES FOR  
GENERAL PURPOSES  
( *Second Revision* )

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# *Indian Standard*

## SPECIFICATION FOR SILICA REFRACTORIES FOR GENERAL PURPOSES

### ( *Second Revision* )

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# *Indian Standard*

## SPECIFICATION FOR SILICA REFRACTORIES FOR GENERAL PURPOSES ( *Second Revision* )

### 0. FOREWORD

**0.1** This Indian Standard ( Second Revision ) was adopted by the Indian Standards Institution on 21 October 1980, after the draft finalized by the Refractories Sectional Committee had been approved by the Structural and Metals Division Council.

**0.2** This standard has been prepared to meet the requirements of silica refractories for general purposes, such as in the steel and glass industries. ~~The requirements of silica refractories for use in coke ovens have been specified in IS : 4812-1972\*.~~

**0.3** This standard was published for the first time in 1958. As a result of the experience gained during these years it was felt that the clause for true specific gravity should be revised. Accordingly it was decided that true specific gravity may be tested by either Rees-Hugill Flask Method or Pycnometer method. While revising the standard, the opportunity was taken to bring this standard in line with the other Indian Standards on refractories.

**0.4** It is to be pointed out that though a number of tests have been prescribed in this standard, it is not intended that all of them should be carried out in each case, as by a judicious application to some of the tests it should be possible to judge the quality of the material in a given lot. However, the actual tests to be conducted in each case would depend upon the service conditions for which the refractories are required, and purchasers are advised to indicate these conditions at the time of placing an indent or order.

**0.5** For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960†. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

\*Specification for silica refractories for coke oven.

†Rules for rounding off numerical values ( *revised* ).

## **1. SCOPE**

**1.1** This standard is intended to cover the requirements for silica refractory bricks and shapes, for general purposes. It relates only to burnt silica refractories.

## **2. SUPPLY OF MATERIAL**

**2.1** General requirements relating to supply of silica refractories shall be as laid down in IS : 1387-1967\*.

**2.2** The refractories shall be compact, of homogeneous texture and free from cracks, voids and other flaws. They shall be burnt evenly throughout, and shall have sufficient mechanical strength and no soft corners.

## **3. TOLERANCE ON SIZES**

**3.1** In the case of general purpose silica refractories, variations from the specified dimensions shall be allowed to the extent of  $\pm 1.5$  percent or 1 mm, whichever is greater.

**3.2** All shaped silica bricks for special purposes, such as for carbonizing plants, roofs of furnaces, etc, shall be made to size as given on drawings furnished by the purchaser, subject to a variation not exceeding the limits  $\pm 1$  percent or  $\pm 1$  mm, whichever is greater.

## **4. CHEMICAL COMPOSITION**

**4.1** When determined according to the methods given in IS : 1527-1972†, the chemical composition of the refractories shall be as under:

Silica, <i>Min</i>	94 percent
Alumina, <i>Max</i>	1.5 percent

NOTE — The alumina content may also be determined according to the methods given in IS : 1335-1959‡.

## **5. PYROMETRIC CONE EQUIVALENT ( SOFTENING POINT )**

**5.1** When determined in accordance with the methods given in IS : 1528 ( Part I )-1974§, the refractories shall have a pyrometric cone equivalent ( PCE ) of not less than standard pyrometric cone ( ASTM ) No. 31.

\*General requirements for the supply of metallurgical materials ( *first revision* ).

†Methods of chemical analysis of high silica refractory materials ( *first revision* ).

‡Methods for the direct determination of alumina in refractory materials ( *tentative* ).

§Determination of pyrometric cone equivalents ( PCE ) or softening point ( *first revision* ).



## 6. REFRACTORINESS UNDER LOAD

**6.1** When tested according to the method specified in IS : 1528 ( Part II )-1974\* the refractories should have be not less than 1 670°C.

## 7. APPARENT POROSITY

**7.1** When tested in accordance with the methods given in IS : 1528 ( Part VIII )-1974\*, the apparent porosity of the refractories shall not be more than 25 percent by volume.

**7.2** In case of hand moulded shapes the requirements shall be mutually agreed between the purchaser and the manufacturer.

## 8. TRUE SPECIFIC GRAVITY

**8.1** The true specific gravity shall be tested either by Rees-Hugill Flask method, or by Pycnometer method as detailed in IS : 1528 ( Part IX )-1980\*. In case of controversy in results, the Pycnometer Method shall be the reference method.

**8.2** The true specific gravity of the refractories shall not be more than 2.35.

## 9. PERMANENT LINEAR CHANGE AFTER RE-HEATING

**9.1** When the refractories are uniformly heated to 1450°C according to the schedule, specified in IS : 1528 ( Part VI )-1974\*, maintained at that temperature within a variation of  $\pm 20^\circ\text{C}$ , for 4 hours and slowly cooled, the permanent linear expansion shall not exceed 1 percent.

## 10. CRUSHING STRENGTH

**10.1** The cold crushing strength of the silica refractories, when determined in accordance with the method given in IS : 1528 ( Part IV )-1974\* shall be not less than 30 MPa ( 300 kgf/cm<sup>2</sup> ).

## 11. SAMPLING

**11.1** Representative samples shall be drawn according to the scheme of sampling given in IS : 1528 ( Part VII )-1974\*.

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\*Methods of sampling and physical tests for refractory materials:

Part II Determination of refractoriness under load ( *first revision* ).

Part VIII Determination of apparent porosity ( *first revision* ).

Part IX Determination of true specific gravity and true density ( *second revision* ).

Part VI Determination of permanent change after reheating ( *first revision* ).

Part IV Determination of cold crushing strength ( *first revision* ).

Part VII Methods of sampling and criteria for conformity ( *first revision* ).

## **12. MARKING**

**12.1** Each refractory brick or shape shall be clearly marked with the manufacturer's name or trade-mark and type of the material.

**12.1.1** The brick or shape may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution ( Certification Marks ) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.